Amendments to the Specification:

On page 1, paragraph 1:

PAT 6,734,453

This application is a divisional of U.S. Serial No. 09/924,392, filed August 7, 2001, which application claims the benefit of U.S. provisional application serial number 60/223,874, filed August 8, 2000 ~~which is~~ both of which are fully incorporated herein by reference.

On page 10, paragraph 2 through page 11, paragraph 2:

Photonic device 10 can have at least one spacer layer 18 between two adjacent repeating units 14. Additionally, a spacer layer 18 can be positioned between more than one pair of adjacent repeating units 14, including all adjacent repeating units 14. The spacer layer is used to improve the structural quality, symmetry, optical quality, or electronic quality of the superalattice. Additionally, superlattice 11 can be positioned or grown on a substrate 20, including but not limited to a silicon substrate, or on a pseudo-substrate buffer layer ~~22~~ that has a lattice constant which is different from a lattice constant of a bulk silicon substrate. Where a psuedo substrate is defined as thick layer with low defect surface density that is grown over the substrate.

In one specific embodiment, superlattice 11 is grown on silicon substrate 20 along (001)- and (111), (211), (311), (411) and the like growth directions of the silicon substrate 20. The growth of the lattice matched and/or lattice mismatched layers 12 can be epitaxially grown on silicon substrate 20 or on a pseudo substrate ~~22~~ that can be a bulk or superlattice strained, or relaxed buffer layer. Figures 2(b) illustrates superlattice 11 growth in the (111) direction. Figure 2(c) illustrates an in-plane erbium/silicon active layer crystal structure without defects grown on a (111)-orientated surface.

In various embodiments, active region layer 16 has a lattice layer that is less than, the same as or equal to a lattice constant of silicon substrate 20 or pseudo-substrate buffer layer ~~22~~. It may be preferred for active region layer 16 containing the rare-earth atoms to be in a mechanically stressed state when grown epitaxially on silicon substrate 20 or pseudo substrate ~~22~~ by either tension, lattice mismatching or compression. This reduces the defect density which in turn improves structural quality.

In certain embodiments, at least one layer in a repeating unit 14 has a lattice constant that is sufficiently different from, (i) a lattice constant of substrate 20 to have an opposite